STRATEGY FOR RECOVERY

A core area represents the closest approximation of a biologically functioning unit for bull trout (See Appendix 1). The combination of core habitat (*i.e.*, habitat that could supply all the necessary elements for the long-term security of bull trout, including both spawning and rearing as well as foraging, migrating, and overwintering) and a core population (*i.e.*, bull trout inhabiting a core habitat) constitutes the basic core area upon which to gauge recovery within a recovery unit. Within the core area, many local populations may exist. Local populations are a group of bull trout that spawn within a particular stream or portion of a stream system. The extent of historic and current migratory connectivity, with consideration of natural and manmade barriers, survey and movement data, and genetic analysis need to be considered when defining core areas. Except where supported by biological or geographic evidence, core areas are considered to be distinct and their boundaries do not overlap.

Current known distribution of bull trout in the Northeast Washington Recovery Unit is highly fragmented with only occasional sightings of bull trout. Distribution includes the Pend Oreille River and a portion of the South Fork of the Salmo River. Little information exists as to the historic distribution of migratory bull trout. Genetic information on bull trout in the recovery unit is lacking. It is likely that historic distribution of bull trout was more expansive than currently observed. Bull trout most likely migrated seasonally from Lake Pend Oreille downstream into the Pend Oreille River tributaries to spawn and rear. Use of the mainstem Pend Oreille River for feeding and overwintering was also likely. Historic distribution of bull trout in major tributaries of this recovery unit, including the San Poil, Kettle, and Spokane Rivers is either unavailable, or anecdotal. More detailed presence/absence surveys need to be conducted to justify inclusion of these, and other tributaries as part of the recovered distribution within the Northeast Washington Recovery Unit.

For purposes of recovery, the Northeast Washington Recovery Unit has one core area at this time and one extant local population (Le Clerc Creek complex). The Pend Oreille River downstream from Albeni Falls Dam including

all tributaries to the Canadian Border is considered a single core area. While in a separate recovery unit, the Northeast Washington Recovery Unit Team feels that complete recovery for the Pend Oreille River in Washington is contingent upon reconnection with the Lower Clark Fork subunit in Idaho. The Columbia River and all other tributaries (*e.g.* South Fork of the Salmo, Sanpoil, Kettle, Spokane, Colville) above Chief Joseph Dam are not considered as part of a core area, but are identified as a primary research need.

The exclusion of the South Fork of the Salmo at this time is based on the need for more information on Canadian bull trout populations in the Salmo River. Research needs apply to areas where the Team feels more information is needed in order to accurately determine full recovery in this recovery unit and implement recovery actions. It is likely that the essential elements for core habitat do not geographically exist in the U.S. portion of the Salmo River system. However, the result of research efforts may include the designation of an additional core and local populations. Increased coordination with British Columbia is needed to identify limiting factors, necessary actions, and recovery criteria. Collection of additional information regarding the current use and potential for re-establishment may also result in a revision of the identification of core areas.

Recovery Goals and Objectives

The goal of the bull trout recovery plan is to **ensure the long-term persistence of self-sustaining, complex, interacting groups of bull trout distributed throughout the species' native range, so that the species can be delisted.** To achieve this goal the following objectives have been identified for bull trout in the Northeast Washington Recovery Unit:

•   Maintain current distribution of bull trout and restore distribution in previously occupied areas within the Northeast Washington Recovery Unit.

•   Maintain stable or increasing trends in abundance of bull trout.

•   Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.

•   Conserve genetic diversity and provide opportunity for genetic exchange.

Rieman and McIntyre (1993) and Rieman and Allendorf (2001) evaluated the bull trout population numbers and habitat thresholds necessary for long-term viability of the species. They identified four elements, and the characteristics of those elements, to consider when evaluating the viability of bull trout populations. These four elements are 1) number of local populations; 2) adult abundance (defined as the number of spawning fish present in a core area in a given year); 3) productivity, or the reproductive rate of the population (as measured by population trend and variability); and 4) connectivity (as represented by the migratory life history form and functional habitat). For each element, the Northeast Washington Recovery Unit Team classified bull trout into relative risk categories based on the best available data and the professional judgment of the team.

The Northeast Washington Recovery Unit Team also evaluated each element under a potential recovered condition to produce recovery criteria. Evaluation of these elements under a recovered condition assumed that actions identified within this chapter had been implemented. Recovery criteria for the Northeast Washington Recovery Unit reflect 1) the stated objectives for the recovery unit, 2) evaluation of each population element in both current and recovered conditions, and 3) consideration of current and recovered habitat characteristics within the recovery unit. Recovery criteria will probably be revised in the future as more detailed information on bull trout population dynamics becomes available. Given the limited information on bull trout, both the level of adult abundance and the number of local populations needed to lessen the risk of extinction should be viewed as a best estimate.

This approach to developing recovery criteria acknowledges that the status of populations in some core areas may remain short of ideals described by conservation biology theory. Some core areas may be limited by natural attributes

or by patch size and may always remain at a relatively high risk of extinction. Because of limited data within the Northeast Washington Recovery Unit, the recovery unit team relied heavily on the professional judgment of its members.

Local Populations

Metapopulation theory is important to consider in bull trout recovery. A metapopulation is an interacting network of local populations with varying frequencies of migration and gene flow among them (Meffe and Carroll 1994) (see Chapter 1). Multiple local populations distributed and interconnected throughout a watershed provide a mechanism for spreading risk from stochastic events. In part, distribution of local populations in such a manner is an indicator of a functioning core area. Based in part on guidance from Rieman and McIntyre (1993), bull trout core areas with fewer than 5 local populations are at increased risk, core areas with between 5 and 10 local populations are at intermediate risk, and core areas with more than 10 interconnected local populations are at diminished risk. While individual sightings of bull trout have been verified within the core area, only one extant local population (Le Clerc Creek complex) has been identified. Based on the aforementioned guidance, bull trout in the Pend Oreille Core Area are considered to be at increased risk. Resident bull trout are known to occur in each core area within the recovery unit. However, an accurate description of their current distribution is unknown, and the identification of resident local populations is considered a research need.

Adult Abundance

The recovered abundance levels in the Northeast Washington Recovery Unit were determined by considering theoretical estimates of effective population size, historical census information, and the professional judgment of recovery team members. In general, effective population size is a theoretical concept that allows us to predict potential future losses of genetic variation within a population due to small population sizes and genetic drift (see Chapter 1). For the purpose of recovery planning, effective population size is the number of adult bull trout that successfully spawn annually. Based on standardized theoretical equations (Crow and Kimura 1970), guidelines have been established for maintaining minimum effective population sizes for conservation purposes. Effective population sizes

of greater than 50 adults are necessary to prevent inbreeding depression and a potential decrease in viability or reproductive fitness of a population (Franklin 1980). To minimize the loss of genetic variation due to genetic drift and to maintain constant genetic variance within a population, an effective population size of at least 500 is recommended (Franklin 1980; Soule 1980; Lande 1988). Effective population sizes required to maintain long-term genetic variation that can serve as a reservoir for future adaptations in response to natural selection and changing environmental conditions are discussed in Chapter 1 of the recovery plan.

For bull trout, Rieman and Allendorf (2001) estimated that a minimum number of 50 to 100 spawners per year is needed to minimize potential inbreeding effects within local populations. In addition, a population size of between 500 and 1,000 adults in a core area is needed to minimize the deleterious effects of genetic variation from drift.

For the purposes of bull trout recovery planning, abundance levels were conservatively evaluated at the local population and core area levels. Local populations containing fewer than 100 spawning adults per year were classified as at risk from inbreeding depression. Bull trout core areas containing fewer than 1,000 spawning adults per year were classified as at risk from genetic drift.

Population estimate in the Pend Oreille Core Area are not currently available. However, due to the relatively few number of bull trout documented recently, abundance of bull trout in Le Clerc Creek local population is probably below 100 individuals per year and should be considered at risk from inbreeding depression. Similarly, bull trout in Pend Oreille Core Area most likely number fewer than 1,000 per year, and should be considered at risk from genetic drift.

Productivity

A stable or increasing population is a key criterion for recovery under the requirements of the Endangered Species Act. Measures of the trend of a population (the tendency to increase, decrease, or remain stable) include population growth rate or productivity. Estimates of population growth rate (*i.e.*,

productivity over the entire life cycle) that indicate a population is consistently failing to replace itself also indicate an increased risk of extinction. Therefore, the reproductive rate should indicate that the population is replacing itself, or growing.

Since estimates of the total population size are rarely available, the productivity or population growth rate is usually estimated from temporal trends in indices of abundance at a particular life stage. For example, redd counts are often used as an index of a spawning adult population. The direction and magnitude of a trend in the index can be used as a surrogate for the growth rate of the entire population. For instance, a downward trend in an abundance indicator may signal the need for increased protection, regardless of the actual size of the population. A population that is below recovered abundance levels, but that is moving toward recovery, would be expected to exhibit an increasing trend in the indicator.

The population growth rate is an indicator of probability of extinction. This probability cannot be measured directly, but it can be estimated as the consequence of the population growth rate and the variability in that rate. For a population to be considered viable, its natural productivity should be sufficient for the population to replace itself from generation to generation. Evaluations of population status will also have to take into account uncertainty in estimates of population growth rate or productivity. For a population to contribute to recovery, its growth rate must indicate that the population is stable or increasing for a period of time. In the Pend Oreille Core Area, bull trout were classified at an increased risk, due to the lack of long-term census information.

Connectivity

The presence of the migratory life history form within the Northeast Washington Recovery Unit was used as an indicator of the functional connectivity of the system. If the migratory life form was absent, or if the migratory form is present but local populations lack connectivity, the core area was considered to be at increased risk. If the migratory life form persists in at least some local populations, with partial ability to connect with other local populations, the core

area was judged to be at intermediate risk. Finally, if the migratory life form was present in all or nearly all local populations, and had the ability to connect with other local populations, the core area was considered to be at diminished risk. Fragmentation by mainstem and tributary dams places the Pend Oreille Core Area at increased risk.

Recovery Criteria

Recovery criteria identified for the Northeast Washington Recovery Unit are the following:

1. **Bull trout are distributed among at least nine local populations in the Northeast Washington Recovery Unit.** Local populations under a recovered condition include: Slate Creek, Indian Creek, Sullivan Creek (including Sullivan Lake and tributaries), Mill Creek, Cedar Creek(Pend Oreille County), Tacoma Creek, Ruby Creek, Calispell Creek, and the Le Clerc Creek complex (including Fourth of July Creek, East Branch Le Clerc Creek, and West Branch Le Clerc Creek). The identified recovered distribution places the Pend Oreille Core Area at an intermediate risk from stochastic events. The Northeast Washington Recovery Unit Team recognizes that natural habitat features within the Pend Oreille River may limit the expansion of bull trout distribution. Designation of local populations is based on survey data and the professional judgement of Northeast Washington Recovery Unit Team members. Further genetic studies are needed in order to more accurately delineate local populations, quantify spawning site fidelity, and straying rates. The complete distribution of resident local populations in the recovery unit is unknown. The Northeast Washington Recovery Unit Team recommends that further studies be conducted in the Pend Oreille Core Area to elucidate the current and recovered distribution of resident bull trout in the recovery unit. Additional local populations may be added to this total as additional information is gathered in areas outside the currently designated core area for this recovery unit. Geographic distribution of resident local populations should be identified within three years and actions needed to

implement re-introduction efforts will be incorporated in the five year review of the Northeast Washington Recovery Unit plan.

2.   **Estimated abundance of bull trout among all local populations in the Northeast Washington Recovery Unit is between 1,575 and 2,625 migratory adults.** Recovered abundance for the Pend Oreille Core Area was derived using the professional judgement of the Team and estimation of productive capacity of identified local populations. Recovered population estimates for individual local population are: Indian Creek 50 to 100 adults, Slate Creek 25 to 75 adults, Mill Creek 50 to 150 adults, Cedar Creek 150 to 250 adults, Ruby Creek 100 to 200 adults, Tacoma Creek 150 to 350 adults, Calispell Creek 50 to 100 adults, Sullivan Creek (including Sullivan Lake and tributaries) 600 to 850 adults, and Le Clerc Creek 400 to 550 adults. Resident life history forms are not included in this estimate, but are considered a research need. As more data is collected, recovered population estimates will be revised to more accurately reflect both the migratory and resident life history components.

The established recovered abundance levels assume that threats (including fragmentation of local populations) have been addressed and that each core area is a functioning metapopulation. While the recovered abundance for each core area fall short of long-term idealized estimates for effective population size (See Chapter 1), the Northeast Washington Recovery Team feels that the estimated ranges accurately reflect achievable recovered abundance levels. In the Pend Oreille Core Area, the identified recovered abundance levels should prevent inbreeding depression and minimize the loss of genetic variation due to genetic drift. The U.S. Fish and Wildlife Service will evaluate the identified abundance levels relative to the maintenance of long-term genetic variation which would provide the population the ability to adapt to natural selection and changing environmental conditions.

3.   **Adult bull trout exhibit a stable or increasing trend for at least two generations at or above the recovered abundance level within the**

Pend Oreille Core Area. The development of a standardized monitoring and evaluation program which would accurately describe trends in bull trout abundance is identified as a priority research need. As part of the overall recovery effort, the U.S. Fish and Wildlife Service will take the lead in addressing this research need by forming a multi-agency technical team to develop protocols to evaluate trends in bull trout populations.

4. **Specific barriers to bull trout migration in the Northeast Washington Recovery Unit have been addressed.** The Northeast Washington Recovery Unit Team has identified that the primary impediment to bull trout recovery is the fragmentation of habitat within the system by hydroelectric facilities. The Northeast Washington Recovery Unit Team recommends that to achieve recovery in the Pend Oreille Core Area, connectivity needs to be restored at Albeni Falls, Box Canyon, and Boundary Dams.

Identification of these barriers does not imply that other actions associated with passage (*e.g.*, Sullivan Creek and Cedar Creeks), habitat degradation, or nonnative species control are not crucial for recovery to occur. To achieve recovery in the Northeast Washington Recovery Unit, all four recovery criteria (local populations, abundance, population trends, and barrier removal) must be achieved. It is likely that meeting all four recovery criteria will not be accomplished by only by addressing barriers.

Recovery criteria for the Northeast Washington Recovery Unit were established to assess whether recovery actions are resulting in the recovery of bull trout. The Northeast Washington Recovery Unit Team expects that the recovery process will be dynamic and will be refined as more information becomes available. While removal of bull trout as a species under the Endangered Species Act (*i.e.*, delisting) can only occur for the entity that was listed (Columbia River distinct population segment), the criteria listed above will be used to determine when the Northeast Washington Recovery Unit is fully contributing to recovery of the population segment.

Research Needs

Based on the best scientific information available, the Team has identified recovery criteria, and actions necessary for recovery of bull trout within the Northeast Washington Recovery Unit. However, the recovery unit Team recognizes that many uncertainties exist regarding bull trout population abundance, distribution, and actions needed. The recovery Team feels that if effective management and recovery are to occur, the recovery plan for the Northeast Washington Recovery Unit be viewed as a "living" document, which will be updated as new information becomes available. As part of this adaptive management approach, the Northeast Washington Recovery Unit Team has identified research needs which are essential within the recovery unit.

Monitoring and Evaluation

The Northeast Washington Recovery Unit Team realizes that recovery criteria will most likely be revised as recovery actions are implemented and bull trout populations begin to respond. In addition, the Northeast Washington Recovery Unit Team will rely on adaptive management to better refine both abundance and distribution criteria. Adaptive management is a continuing process of planning, monitoring, evaluating management actions, and research. This approach will involve a broad spectrum of user groups and will lay the framework for decision making relative to recovery implementation and ultimately, the possible revision of recovery criteria in this recovery unit.

This recovery unit chapter is the first step in the planning process for bull trout recovery in Northeast Washington Recovery Unit. Monitoring and evaluation of population levels and distribution will be an important component of any adaptive management approach. The U.S. Fish and Wildlife Service will take the lead in developing a comprehensive monitoring approach which will provide guidance and consistency in evaluating bull trout populations. Development and application of models which assess extinction risk relative to abundance and distribution parameters are critical in refining recovery criteria as

the recovery process proceeds. Application of agreed upon methods for evaluating recovery would benefit the scientific community and user groups alike.

Artificial Propagation

The Northeast Washington Recovery Unit Team has identified that reaching a recovered condition within the Pend Oreille Core Area within 25 years could require the use of artificial propagation. Artificial propagation could involve the transfer of bull trout into unoccupied habitat within the historic range (ODFW 1997). In addition, artificial propagation could involve the use of Federal or state hatcheries to assist in recovery efforts (MBTSG 1996). The Northeast Washington Recovery Team recommends that studies be initiated to determine the effectiveness and feasibility of using artificial propagation in bull trout recovery.

Any artificial propagation program instituted in the Northeast Washington Recovery Unit must follow the joint policy of the Fish and Wildlife Service and the National Marine Fisheries Service regarding controlled propagation of listed species (65 FR 56916). The overall guidance of the policy is that every effort should be made to recover a species in the wild before implementing a controlled propagation program. If necessary, an appropriate plan would need to be approved that considers the effects of transplantation on other species as well as the donor bull trout populations. Transplanting listed species must be authorized by the U.S. Fish and Wildlife Service and meet applicable State fish-handling and disease policies.

While artificial propagation has played an important role in the recovery of other listed fish species, where possible, the overall recovery strategy for bull trout in the Northeast Washington Recovery Unit will emphasize the removal of threats and habitat restoration. Recovery should emphasize identifying and correcting threats affecting bull trout and bull trout habitats. Artificial propagation programs should not be implemented unless reasons for decline have been addressed.

Genetic Studies

The Northeast Washington Recovery Unit Team recommends that studies be initiated to describe the genetic makeup of bull trout in the Pend Oreille Core Area. This information would be essential for a more complete understanding of bull trout interactions and population dynamics. In addition, a recovery unit wide evaluation of the current and potential threat of bull trout hybridization with brook trout is needed. The ability to evaluate the potential harm to specific local populations could be used in prioritizing management actions. Genetic baseline information would also be a necessity in the implementation of any artificial propagation program.

Bull Trout Distribution

A primary research need is a complete understanding of the current, and future, role that the mainstem Columbia and major tributary systems (*e.g.*, Sanpoil and Kettle Rivers) should play in the recovery of bull trout. It seems likely that fluvial bull trout occurred seasonally in the mainstem Columbia River and may have, and may still, reside in tributaries as isolated resident populations. It is essential to establish with certainty the current distribution of bull trout within the Northeast Washington Recovery Unit. To this end, the Team recommends the development and application of a scientifically accepted, statistically rigorous, standardized protocol for determining present distribution of bull trout. Application of such a protocol will improve the Team's ability to identify additional core areas and/or revise the recovery criteria for this recovery unit.

More detailed research is needed on the current status of resident bull trout within the Pend Oreille Core Area. Included in this information need is a greater understanding of the interaction between resident and migratory life history forms. The resident component could represent and important component for long term persistence, and a more complete understanding of the potential productive capacity of the Pend Oreille Core Area to support resident populations is needed.

The Northeast Washington Recovery Unit Team based estimates of recovered abundance levels and number of local populations on the best available information and professional judgement. Historic abundance levels and distribution of spawning populations is scarce, and most records are anecdotal. The Team realizes that recovery criteria will most likely be revised as recovery actions are implemented and bull trout populations begin to respond. The Team will rely on adaptive management to better refine both abundance and distribution criteria. Adaptive management is a continuing process of planning, monitoring, evaluating management actions, and research. This adaptive management approach will identify actions that maximize the ability to achieve recovery objectives. In addition, this approach will provide a better understanding of key uncertainties, crucial to long term management actions.

This recovery unit chapter is the first step in the planning process for bull trout recovery in Northeast Washington. Monitoring and evaluation of population levels and distribution will be an important component of any adaptive management approach. The U.S. Fish and Wildlife Service will take the lead in developing a comprehensive monitoring approach which will provide guidance and consistency in evaluating bull trout populations. An important component in recovery implementation and the use of adaptive management will be the evaluation of recommended actions.

The Northeast Washington Recovery Unit team has identified an urgent need for the development of a standardized monitoring and assessment program which would more accurately describe current status of bull trout within the recovery unit, as well as identify improvements in current sampling protocols which would allow for monitoring the effectiveness of recovery actions. Development and application of models which assess population trend and extinction risk will be useful in refining recovery criteria as the recovery process proceeds.

Connection with Canadian bull trout populations

Bull trout currently receives no legal protection in Canada, although legislation to protect wildlife species at risk has been introduced in the House of Commons. The province of British Columbia has developed a strategic plan for the recovery of bull trout. British Columbia has increased research and management efforts for the species in recent years and have implemented site-specific activities to improve bull trout habitat, increase migratory capabilities, and enforce stricter angling regulations.

In order to evaluate how the South Fork of the Salmo River will contribute to bull trout recovery in the Northeast Washington Recovery Unit, a coordinated monitoring effort must be adopted with British Columbia. It is likely that the South Fork of the Salmo represents a local population(s) within a larger core area extending across the Canadian border. Migratory and adult habitat necessary for fluvial components of a larger "Salmo River" core area are geographically located in Canada. Increased life history research and monitoring of bull trout in the South Fork of the Salmo and mainstem Salmo River are necessary in order to develop recovery criteria in the South Fork of the Salmo.

ACTIONS NEEDED

Recovery Measures Narrative

In this chapter and all other chapters of the bull trout recovery plan, the recovery measures narrative consists of a hierarchical listing of actions that follows a standard template. The first-tier entries are identical in all chapters and represent general recovery tasks under which specific (*e.g.*, third-tier) tasks appear when appropriate. Second-tier entries also represent general recovery tasks under which specific tasks appear. Second-tier tasks that do not include specific third-tier actions are usually programmatic activities that are applicable across the species' range; they appear in *italic type*. These tasks may or may not have third-tier tasks associated with them; see Chapter 1 for more explanation. Some second-tier tasks may not be sufficiently developed to apply to the recovery unit at this time; they appear in *a shaded italic type (as seen here)*. These tasks are included to preserve consistency in numbering tasks among recovery unit chapters and intended to assist in generating information during the comment period for the draft recovery plan, a period when additional tasks may be developed. Third-tier entries are tasks specific to the Northeast Washington Recovery Unit. They appear in the implementation schedule that follows this section and are identified by three numerals separated by periods.

The Northeast Washington Recovery Unit should be updated or revised as recovery tasks are accomplished, as environmental conditions change, and monitoring results or additional information become available. Revisions to the Northeast Washington Recovery Unit chapter will likely focus on priority streams or stream segments within core areas where restoration activities occurred, and habitat or bull trout populations have shown a positive response. The Northeast Washington Recovery Unit Team should meet annually to review annual monitoring reports and summaries, and make recommendations to the U.S. Fish and Wildlife Service.

1   Protect, restore, and maintain suitable habitat conditions for bull trout.

    1.1   Maintain or improve water quality in bull trout core areas or potential core habitat.

        1.1.5   **Investigate and improve water quality**. Coordinate and work with Federal, state, land local entities to improve water quality standards in the Pend Oreille Core Area. A specific limiting factors analysis should be conducted and actions recommended to improve water quality conditions (*e.g.*, temperature, pH, and fecal coliform).

    1.2   Identify barriers or sites of entrainment for bull trout and implement tasks to provide passage and eliminate entrainment.

        1.2.1   **Provide fish passage at Cedar Creek Dam.** Investigate options and design fish passage through the municipal dam (for the town of Ione) on Cedar Creek (Pend Oreille County).

        1.2.2   **Provide fish passage at Albeni Falls Dam.** Investigate options and design fish passage (upstream and downstream) at Albeni Falls Dam.

        1.2.3   **Provide fish passage at Box Canyon Dam.** Investigate options and design fish passage (upstream and downstream) at Box Canyon Dam.

        1.2.4   **Provide fish passage at tributary dams and barriers.** Investigate options and design fish passage (upstream and downstream) at Calispell Creek Pumps, Mill Pond Dam, and Sullivan Lake Dam.

1.2.5 **Remove or replace culverts.** Monitor all road crossings for blockages to upstream passage and replace appropriate existing culverts with fish-friendly structures as opportunity arises. Specific areas of concern include the following culverts: Sullivan Creek (USFS Roads 2220000, 2212200, 220000, 1935000, 1935030, and 1936000), and Saucon Creek (County Road 1935000).

1.2.6 **After elimination of brook trout in the LeClerc Creek watershed, reposition or replace presently impassable culvert on U.S. Forest Service Road 1935080 crossing.**

1.2.7 **After non-native fish species are eliminated, remove historic water diversion on the upper West Branch of the LeClerc Creek system.** The historic water diversion is presently a barrier to fish passage.

1.2.8 **Reduce entrainment.** Reduce entrainment loss at all dams through the installation of devices adjacent to the forebays (*e.g.*, screens, fish friendly turbines)

1.2.9 **Provide fish passage at Boundary Dam.** Investigate options and design fish passage (upstream and downstream) at Boundary Dam.

1.3 Identify impaired stream channel and riparian areas and implement tasks to restore their appropriate functions.

1.3.1 **Repair roads.** Identify and repair, or remove, or relocate roads that are susceptible to mass wasting and bank failures, intercept surface or ground water, negatively impact riparian areas, and inhibit connectivity and natural stream functions Specific areas of concern: County Road 9345 (Sullivan Creek), USFS Road 1200000 (Mill Creek),

County Road 22 (Cedar Creek), USFS Roads 2700050, 2700054, 2700005, 27000423, 27000422, 2700186 (Ruby Creek), USFS Roads 2600629, 2600510, 9521000, 3116240, 3116454, 3116000, 3116205, 3116015 and 3116210, and County road. 2389 (Tacoma Creek), County Road 2110 (Tenmile/North Fork Calispell Creek), USFS Road 1935 (East Branch Le Clerc Creek), USFS Road 1935000 (Middle Branch Le Clerc Creek).

1.3.2   **Develop and implement adaptive management plans for areas impacted by livestock grazing.** Develop, implement, and revise when necessary, adaptive livestock grazing management plans which include performance standards and targets for habitat and water quality conditions that grazing practices must meet in specific watersheds. In areas where grazing has impacted bull trout habitat restoration activities should be implemented. Specific areas of concern include: LeClerc Creek (Middle and East branches), Ruby Creek, Tacoma Creek, and Calispell Creek.

1.3.3   **Improve riparian and instream habitat.** Identify areas within local populations which need habitat restoration. Implement projects to improve instream habitat by restoring recruitment of large woody debris and pool development. Revegetate streambanks to restore shade and canopy, riparian cover, and native vegetation.

1.3.4   **Improve compliance with riparian management guidelines.** Work with private landowners and personnel from Federal, State, county, and local agencies/organizations to improve compliance with guidelines concerning riparian management on all ownership in the Pend Oreille River watershed.

1.3.5 **Maintain roadless portions of bull trout watersheds in a roadless condition.**

1.3.6 **Minimize impacts of dredging and sluicing within streams containing bull trout (*i.e.* Sullivan Creek).**

1.3.7 **Develop habitat restoration/protection guidelines.** Develop and implement guidelines for bull trout that restore or maintain habitat elements (*e.g.*, sediment delivery, water temperature, normative hydrologic function) to provide for recovery.

1.3.8 **Reduce road densities.** Develop and implement strategies to reduce road density in Pend Oreille Core Area (*e.g.*, Sullivan, Le Clerc, Mill, Indian, Tacoma, Ruby, and Calispell creeks).

1.3.9 **Implement habitat restoration at Box Canyon Dam, Sullivan Creek, and Boundary Dam.** Fully implement restoration measures identified in the relicensing process for Box Canyon Dam (license expires 2002), Sullivan Creek (license expires 2008), and Boundary Dam (license expires 2011).

1.4 Operate dams to minimize negative effects on bull trout in reservoirs and downstream.

1.4.1 **Evaluate instream flow requirements of bull trout.** Evaluate instream flows requirements for bull trout downstream from Albeni Falls, Box Canyon, and Boundary, and Sullivan Lake Dams.

      1.4.2   **Design and deploy gas abatement structures.** Design and deploy gas abatement structures to reduce gas supersaturation conditions detrimental to bull trout at Albeni Falls, Box Canyon and Boundary Dams.

    1.5   *Identify upland conditions negatively affecting bull trout habitats and implement tasks to restore appropriate functions.*

2   Prevent and reduce negative effects of nonnative fishes and other nonnative taxa on bull trout.

    2.1   *Develop, implement, and enforce public and private fish stocking policies to reduce stocking of nonnative fishes that affect bull trout.*

    2.2   *Enforce policies for preventing illegal transport and introduction of nonnative fishes.*

    2.3   *Provide information to the public about ecosystem concerns of illegal introductions of nonnative fishes.*

    2.4   *Evaluate biological, economic, and social effects of control of nonnative fishes.*

    2.5   Implement control of nonnative fishes where found to be feasible and appropriate.

      2.5.1   **Reduce abundance and distribution of non-native species.** Reduce non-native brook and brown trout from all streams within the Pend Oreille River watershed through the use of chemicals and/or fishing regulations (*e.g.*, liberalized bag limits).

2.6   Develop tasks to reduce negative effects of nonnative taxa on bull trout.

    2.6.1   **Liberalize harvest regulations to reduce non-natives where bull trout will benefit.**

    2.6.2   **Evaluate presence/absence of introduced fishes in bull trout habitat and determine site specific biological, economic, and social impact.**

3   Establish fisheries management goals and objectives compatible with bull trout recovery, and implement practices to achieve goals.

3.1   Develop and implement state and tribal native fish management plans integrating adaptive research.

    3.1.1   **Develop comprehensive fisheries management plans for Boundary and Box Canyon Reservoirs that incorporate bull trout recovery.**

3.2   Evaluate and prevent overharvest and incidental angling mortality of bull trout.

    3.2.1   **Continue implementation and enforcement of restrictive fishing regulations.**

    3.2.2   **Provide information to anglers.** Provide information to anglers about bull trout identification, special regulations, fisheries management of endangered species, and how to reduce hooking mortality of bull trout caught incidentally in recreational fisheries.

3.2.3 **Reduce angler pressure.** Reduce angler pressure in areas where incidental mortality of bull trout is detrimental to recovery.

3.3 Evaluate potential effects of introduced fishes and associated sport fisheries on bull trout recovery and implement tasks to minimize negative effects on bull trout.

3.3.1 **Evaluate impacts of stocking programs.** Evaluate impacts of Kalispel tribe largemouth bass stocking program on bull trout, including risks from competition and predation.

3.4 Evaluate effects of existing and proposed sport fishing regulations on bull trout.

3.4.1 **Evaluate the impact of scientific collection permits on bull trout local populations.** Ensure that permits issued for scientific collection in the Pend Oreille Core Area minimize impacts to bull trout.

4 Characterize, conserve, and monitor genetic diversity and gene flow among local populations of bull trout.

4.1 *Incorporate conservation of genetic and phenotypic attributes of bull trout into recovery and management plans.*

4.2 *Maintain existing opportunities for gene flow among bull trout populations.*

4.3 Develop genetic management plans and guidelines for appropriate use of transplantation and artificial propagation.

4.3.1   **Establish genetic protocols.** Establish genetic reserve protocols and standards for initiating, conducting, and evaluating artificial propagation programs.

4.3.2   **Establish genetic baselines.** Genetic baseline descriptions of bull trout in the Pend Oreille Core Area is essential for a complete understanding of bull trout interactions and population dynamics.

4.3.3   **Evaluate the threat of hybridization with brook trout.** Recovery Unit wide evaluation of the current and potential threat of bull trout hybridization with brook trout is needed. The ability to evaluate the potential harm to specific local populations can be used in prioritizing management actions.

4.3.4   **Evaluate the feasibility of an artificial propagation program.** Re-establishment of local populations within the Pend Oreille Core Area may require the use of artificial propagation. Studies should be initiated to determine the effectiveness and feasibility of using fish transfers and hatcheries to assist in any future re-introduction efforts.

5   Conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks.

    5.1   *Design and implement a standardized monitoring program to assess the effectiveness of recovery efforts affecting bull trout and their habitats.*

        5.1.1   **Increase monitoring**. Increase monitoring of adfluvial populations to determine population status, distribution,

movement and seasonality of use of different habitat types by adult and sub-adult bull trout.

>5.1.2 **Develop a comprehensive map of primary bull trout tributary reaches for focusing habitat protection and recovery efforts.**

5.2 Conduct research evaluating relationships among bull trout distribution and abundance, bull trout habitat, and recovery tasks.

>5.2.1 **Identify threats that may be limiting bull trout in watersheds not already evaluated.**

5.3 *Conduct evaluations of the adequacy and effectiveness of current and past BMPs in maintaining or achieving habitat conditions conducive to bull trout recovery.*

5.4 *Evaluate effects of diseases and parasites on bull trout, and develop and implement strategies to minimize negative effects.*

5.5 *Develop and conduct research and monitoring studies to improve information concerning the distribution and status of bull trout.*

5.6 *Identify evaluations needed to improve understanding of relationships among genetic characteristics, phenotypic traits, and local populations of bull trout.*

6 Use all available conservation programs and regulations to protect and conserve bull trout and bull trout habitats.

6.1 Use partnerships and collaborative processes to protect, maintain, and restore functioning core areas for bull trout.

6.1.1 **Support collaborative efforts**. Support collaborative efforts by local watershed groups to accomplish site specific protection/restoration activities by implementing existing regulations.

6.1.2 **Provide long-term habitat protection**. Provide long-term habitat protection through purchase from willing sellers, land exchange, conservation easements, managements, etc. Initial emphasis should be on identified bull trout spawning and rearing streams.

6.2 *Use existing Federal authorities to conserve and restore bull trout.*

6.3 Enforce existing Federal and State habitat protection standards and regulations and evaluate their effectiveness for bull trout conservation.

6.3.1 **Review and implement Forest and Fish standards.** Ensure full compliance monitoring associated with Forest and Fish standards and modify rules through adaptive management when indicated by effectiveness monitoring.

6.3.2 **Monitor and enforce Hydraulic Permit Applications in the State of Washington.**

7 Assess the implementation of bull trout recovery by recovery units, and revise recovery unit plans based on evaluations.

7.1 *Convene annual meetings of each recovery unit team to generate progress reports on implementation of the recovery plan for the Fish and Wildlife Service.*

7.2   *Develop and implement a standardized monitoring program to evaluate the effectiveness of recovery efforts (coordinate with 5.1).*

7.3   Revise scope of recovery as suggested by new information.

    7.3.1   **Periodically review progress toward recovery goals and assess recovery task priorities.** Annually review progress toward population and adult abundance criteria and recommend changes, as needed, to the Northeast Washington Recovery Unit chapter. In addition, review tasks, task priorities, completed tasks, budget, time frames, particular successes, and feasibility within the Northeast Washington Recovery Unit.